

Remarks

Claims 1-15 are pending herein. By this Amendment, claim 7 has been amended, and new claims 14 and 15 have been added.

Claim 7 has been amended to correct a minor grammatical error.

New claims 14 and 5 depend upon claims 6 and 13, respectively, and recite that the distance between the electrodes is such that a distance between a first of said electrodes and a wafer disposed on a second of said electrodes is from 30 to 90 mm. Support for the new claims can be found in the specification at, e.g., page 6, lines 25-26 and page 9, lines 3-5.

In the Office Action, claims 1-13 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,326,302 to Joubert (“Joubert”) in view of U.S. Patent No. 6,869,542 to Desphande (“Desphande”) and further in view of U.S. Patent No. 6,069,090 to Eriguchi (“Eriguchi”).

In view of the amendments and remarks herein, Applicants respectfully request reconsideration and withdrawal of the rejection set forth in the Office Action.

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Independent claims 1 and 7 both recite the use of a residence time represented by V/S having a value from 20 to 60 msec, where V (m^3) represents an effective processing space volume as a product of an area of the substrate and a distance between the electrodes, and S (m^3/sec) represents a gas exhaust velocity from the processing vessel. According to the instant specification:

When the residence time is longer than 60 msec, it may be possible that the CD shift value takes an excessively large plus value. (page 10, line 35 – page 11, line 1)

On the other hand, when the residence time is shorter than 20 msec, etching speed is decelerated, and thus the CD shift value is prone to take an excessively large minus value. (page 11, lines 1-4)

As apparent from above, in the experiment (7) in which the residence time was more than 60 msec, the CD shift values were prone to take large plus values. In the experiment (9) in which the residence time was around 20 msec, the satisfactory CD shift values were shown, while a small quantity of etching residue was found in a trench part. As a result, when the residence time is less

than 20 msec, it is expected that there generates significant etching residue. (page 17, lines 19-26).

Thus, the residence time used in the methods set forth in claims 1 and 7 is an important feature of the claimed methods in that it affects (at least) CD shift value, etching speed and amount of etching residue.

Neither Joubert, Desphande nor Eriguchi teaches the residence time recited in claims 1 and 7. Eriguchi mentions a “time of residence” at col. 6, lines 26-34 but only in connection with the time of residence of the etch product over the etch surface, that varies depending upon an etch pattern. Eriguchi does not teach a residence time “represented by V/S having a value from 20 to 60 msec, where V (m^3) represents an effective processing space volume as a product of an area of the substrate and a distance between the electrodes, and S (m^3/sec) represents a gas exhaust velocity from the processing vessel”, as recited in instant claims 1 and 7. Thus, the effects of the residence time on CD shift value, etching speed and amount of etching residue discussed in the instant specification are unexpected in view of the references cited in the Office Action.

Thus, for at least this reason, Applicants submit that claims 1-13 would not have been obvious over Joubert in view of Desphande and further in view of Eriguchi.

None of the references cited in the Office Action teaches or suggests the distance between electrodes recited in new claims 14 and 15. Thus, Applicants respectfully request that new claims 14 and 15 are patentable over the references cited in the Office Action for at least this additional reason.

In view of the amendments and remarks herein, Applicants respectfully request that the rejection set forth in the Office Action be withdrawn and that claims 1-15 be allowed.

If any additional fees are due in connection with the filing of this paper, such as fees under 37 C.F.R. §§1.16 or 1.17, please charge the fees to Deposit Account 02-4300; Order No. 033082M239.

Respectfully submitted,
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Enclosures: (1) Petition for Extension of Time
(2) Check for the sum of \$120